
The OSG Resource Selection Service (ReSS)

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The Resource Selection Project

- n The Resource Selector Service implements cluster-level Workload Management on OSG.
 - n The project started in Sep 2005
 - n Sponsors
 - q DZero contribution to the Common Project
 - q FNAL-CD (30% FTE Gabriele, 50% FTE Tanya)
 - n Collaboration of the Sponsors with
 - q OSG (TG-MIG, ITB, VDT / John Weigand)
 - q CEMon gLite Project (INFN)
 - q FermiGrid
 - q Glue Schema Group
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The Resource Selection Service

Motivations / Deliverables

- n A Resource Selector allows...
 - q ...expressing requirements on the resources in the job description
 - q ...the user to refer to *abstract* characteristics of the resources in the job description
 - n The Resource Selection Project has two major goals
 1. Enable OSG resource usage by DZero. Jobs are prepared and data is handled by the SAM-Grid.
 2. Develop and deploy a Resource Selection Service that VOs with requirements on job management similar to DZero can use.
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Resource Selection Example

Abstract Resource Characteristic

```
universe = globus
globusscheduler = $$(GlueCEInfoContactString)
requirements = TARGET.GlueCEAccessControlBaseRule == "VO:DZero"
executable = /bin/hostname
arguments = -f
queue
```

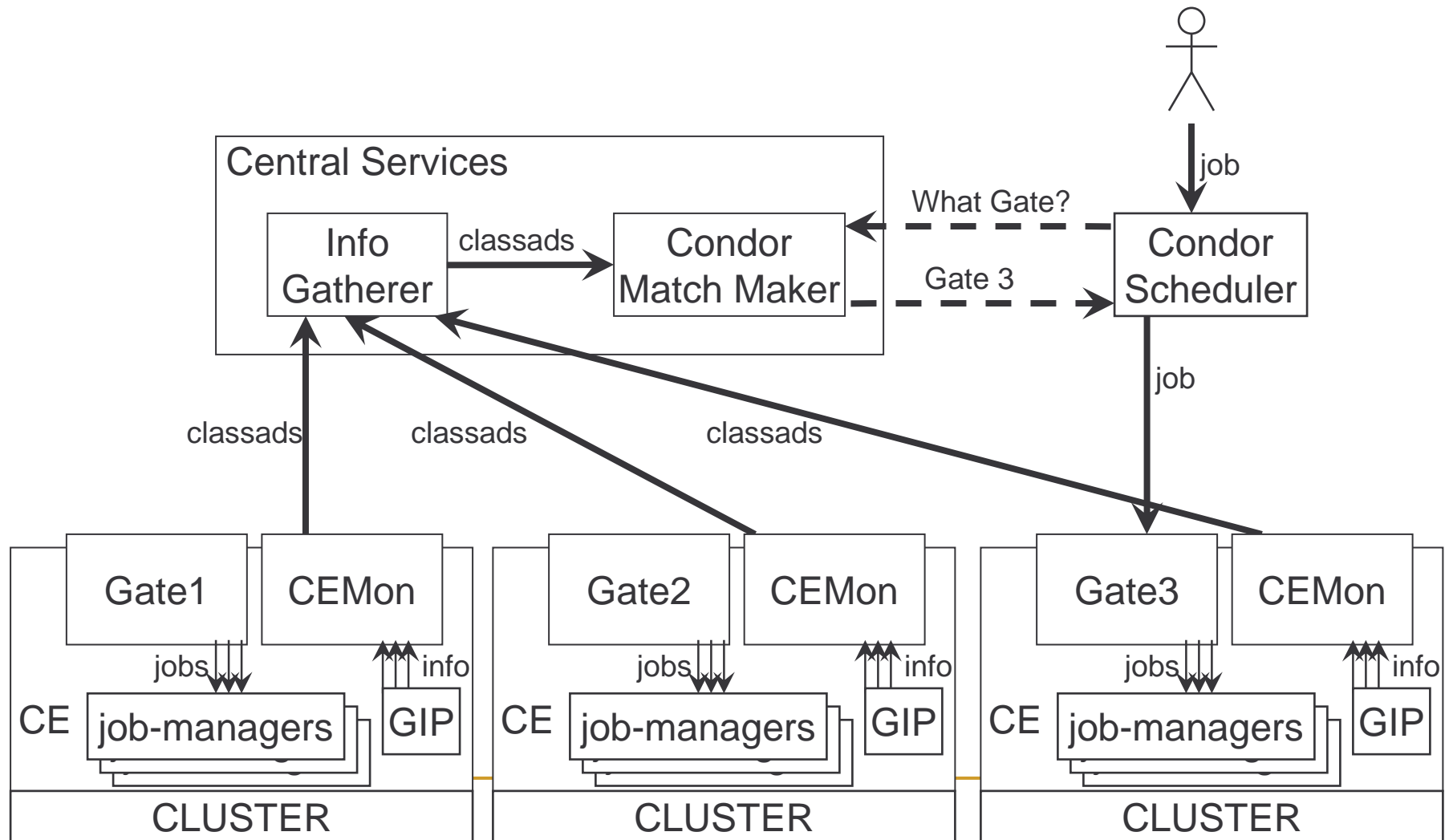
Resource Requirements

Job Description

Resource Description

```
MyType = "Machine"
Name = "antaeus.hpcc.ttu.edu:2119/jobmanager-lsf-dzero.-1194963282"
Requirements = (CurMatches < 10)
ReSSVersion = "1.0.6"
TargetType = "Job"
GlueSiteName = "TTU-ANTAEUS"
GlueSiteUniqueID = "antaeus.hpcc.ttu.edu"
GlueCEName = "dzero"
GlueCEUniqueID = "antaeus.hpcc.ttu.edu:2119/jobmanager-lsf-dzero"
GlueCEInfoContactString = "antaeus.hpcc.ttu.edu:2119/jobmanager-lsf"
GlueCEAccessControlBaseRule = "VO:dzero"
GlueCEHostingCluster = "antaeus.hpcc.ttu.edu"
GlueCEInfoApplicationDir = "/mnt/lustre/antaeus/apps"
GlueCEInfoDataDir = "/mnt/hep/osg"
GlueCEInfoDefaultSE = "sigmorch.hpcc.ttu.edu"
GlueCEInfoLRMSType = "lsf"
GlueCEPolicyMaxCPUTime = 6000
GlueCEStateStatus = "Production"
GlueCEStateFreeCPUs = 0
GlueCEStateRunningJobs = 0
GlueCEStateTotalJobs = 0
GlueCEStateWaitingJobs = 0
GlueClusterName = "antaeus.hpcc.ttu.edu"
GlueSubClusterWNTmpDir = "/tmp"
GlueHostApplicationSoftwareRunTimeEnvironment = "MountPoints,VO-cms-CMSSW_1_2_3"
GlueHostMainMemoryRAMSize = 512
GlueHostNetworkAdapterInboundIP = FALSE
GlueHostNetworkAdapterOutboundIP = TRUE
GlueHostOperatingSystemName = "CentOS"
GlueHostProcessorClockSpeed = 1000
GlueSchemaVersionMajor = 1
...
```

The Resource Selection Service Architecture



ReSS Validation

- n Validated that requirements of DZero are met by the ReSS central services

- q <https://twiki.grid.iu.edu/twiki/bin/view/ResourceSelection/ReSSValidationTest>

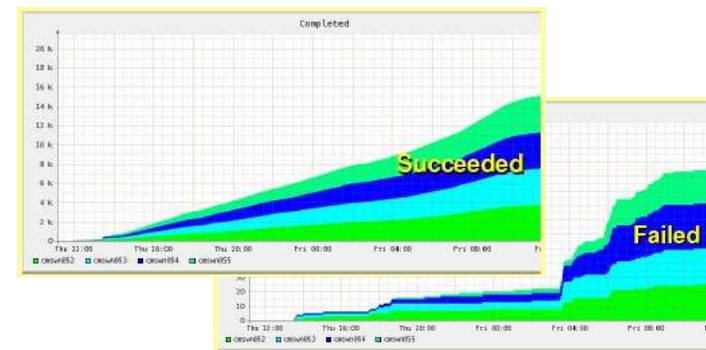
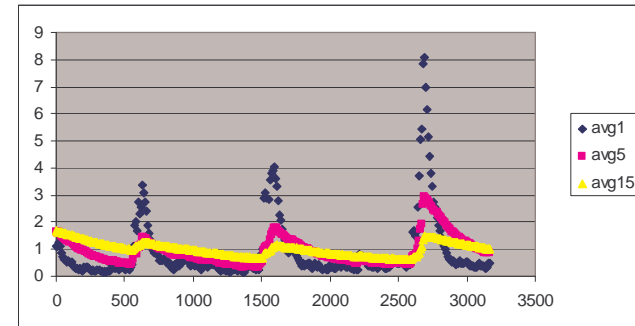
- n Investigated the impact on resources (load, mem, ...) of CEMon at OSG CEs

- q <https://twiki.grid.iu.edu/twiki/bin/view/ResourceSelection/CEMonPerformanceEvaluation>

- n US CMS studied the scalability of ReSS central services for US CMS requirements

- q <https://twiki.grid.iu.edu/twiki/bin/view/ResourceSelection/ReSSEvaluationByUSCMS>

Jobs Submitted = 1 job/sec for hour.
Total Jobs Submitted = 3600
First Job Matched = 9/8/2006 16:33:00
Last Job Matched = 9/9/2006 02:05:53
Resources Satisfying Jobs = 2 (1800 jobs per resource)
Total Number Of Resources = 426
Max Jobs Matched Per Negotiation Cycle Per Resource = 10
Total Jobs Matched In One Negotiation Cycle = 20
Longest Negotiation Cycle: 2 sec
Shortest Negotiation Cycle: 0 sec
Average Negotiation Cycle: 0.772222222222 sec



Status

- n Development is mostly done
 - q We may still add SE to the resource selection process
 - n Integration of ReSS with Fermigrid is done
 - n Assisting Deployment of ReSS on Production OSG
 - q Worked with ITB since May 06, targeting deployment for Summer 06
 - q Validation process very slow: OSG 0.6.0 released on Mar 07.
 - n Using ReSS on SAM-Grid / OSG for DZero data reprocessing for the available sites
 - q However, the delay in OSG deployment makes operations difficult (keeping “right” amount of idle jobs at sites)
 - n Working with OSG VOs to facilitate ReSS usage
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Current Deployment

Site	Gatekeeper	2007-03-05-14-00-08	2007-03-05-18-00-09	2007-03-06-00-13	2007-03-06-06-00-10	2007-03-06-12-00-09	2007-03-06-18-00-07	2007-03-07-00-14	2007-03-07-06-00-08	2007-03-07-12-00-11	2007-03-07-18-00-09
CornellLEPP	lnx6211.lns.cornell.edu:2119/jobmanager-sge	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up
NERSC-VM-VTB0	osp-vtb00.nersc.gov:2119/jobmanager-sge	Up	Down	Up	Up	Down	Down	Down	Down	Down	Down
TTU-ANTAEUS	antaeus.hpcc.ttu.edu:2119/jobmanager-lsf	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down
UCRHEP	top.ucr.edu:2119/jobmanager-condor	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up
UCTier3	uct3-edge6.uchicago.edu:2119/jobmanager-pbs	Up	Up	Up	Up	Up	Up	Up	Up	Down	Up
UVaHEP-T3	osg-hep.phys.virginia.edu:2119/jobmanager-pbs	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up
Vanderbilt	vmpeg01.vampire:2119/jobmanager-pbs	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up
cmsosgce.fnal.gov:2119/jobmanager-condor		Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
red.unl.edu:2119/jobmanager-pbs		Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
sammy.fnal.gov:2119/jobmanager-condor		Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
stitch.oscer.ou.edu:2119/jobmanager-condor		Up	Up	Up	Up	Up	Up	Up	Up	Up	Up

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Remaining Tasks for the Project

- n Assist with OSG deployment (i.e. CEMon at sites)
 - n Assist OSG VOs (e.g. Engagement) to use ReSS
 - n Integrate ReSS with GlideIn Factory
 - n Check with collaborators if they are interested in SE support
 - q ...one of the last development activities on the table today
 - n Assist OSG with Truth-In-Advertising (GIP)
 - n Move project from devel. to maintenance
 - q estimated effort reduction: from 0.8 FTE to 0.25 FTE
 - n Maintain CEMon in VDT reasonably up to date
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Conclusions

- n ReSS Project is naturally moving from development to maintenance
 - n We are still involved in integration and supporting activities
 - n More info at <http://osg.ivdgl.org/twiki/bin/view/ResourceSection/>
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